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Surface Science 433–435 (1999) 915–925

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Instructions for Authors Concerning the Use of Keywords for Indexing in Surface Science

Given below is a listing of keywords for the Subject and Materials Indexes used by Surface Science. The Subject index is divided into three classes: Theoretical Methods, Experimental Methods, and Phenomena. Please indicate below your abstract at least one keyword from as many of the three classes as appropriate to describe the contents of your manuscript. (You may also tick the appropriate box and include this list with your manuscript.) Occasionally it will not be possible to include a keyword from all three classes, e.g., a general theory manuscript will not exhibit a keyword from the Experimental Methods class. In such a case, omit the entry from the inapplicable class. Also, if appropriate, please select a keyword from one of the three classes of the Materials Index, i.e., Elemental and Chemical Identity, Physical State, and Electrical and Magnetic Behavior. You may use multiple keywords in the above mentioned six classes **up to a maximum of eight in total**. For example, many experimental papers will be characterized by more than one keyword in the Experimental Methods class of the Subject Index as well as by several keywords from the Materials Index. The keywords will be used as labels for the use in electronic navigation tools. Thus, careful attention to giving a correct, useful description of your work will generate more thorough use of your paper once it is published.

version of 2 May 1998

Subject index

Theoretical methods, models and techniques

- ☐ Ab initio quantum chemical methods and calculations
- ☐ Atom–solid interactions, scattering, diffraction
- ☐ Atomistic dynamics
- ☐ Computer simulations
- ☐ Construction and use of effective interatomic interactions
- ☐ Density functional calculations
- ☐ Electron density, excitation spectra calculations
- ☐ Electron–solid interactions, scattering, diffraction
- ☐ Equilibrium thermodynamics and statistical mechanics
- ☐ Green's function methods
- ☐ Ion–solid interactions, scattering, channeling
- ☐ Ising models
- ☐ Jellium models
- ☐ Many body and quasi-particle theories
- ☐ Models of non-equilibrium phenomena
- ☐ Models of non-linear phenomena
- ☐ Models of surface chemical reactions
- ☐ Models of surface kinetics
- ☐ Molecular dynamics
- ☐ Monte Carlo simulations
- ☐ Non-equilibrium thermodynamics and statistical mechanics
- ☐ Semi-empirical models and model calculations

Experimental sample preparation and characterization methods

- ☐ Adsorption isotherms
- ☐ Appearance potential spectroscopy
- ☐ Atom–solid reactions
- ☐ Atom–solid scattering and diffraction – elastic
- ☐ Atom–solid scattering and diffraction – inelastic
- ☐ Atomic force microscopy
- ☐ Auger electron spectroscopy
- ☐ Chemical vapor deposition
- ☐ Desorption induced by electronic transitions (DIET)
  - ☐ *Angle resolved DIET* (including electron stimulated desorption ion angular distribution (ESDIAD))
  - ☐ *Electron stimulated desorption (ESD)*
  - ☐ *Photon stimulated desorption (PSD)*
  - ☐ *Surface photochemistry*
- ☐ Electrical transport measurements
- ☐ Electrochemical methods
- ☐ Electron emission measurements
  - ☐ *Exoelectron emission*
  - ☐ *Field emission*
  - ☐ *Photoemission (total yield)*
  - ☐ Secondary electron emission☐
  - ☐ *Thermally-stimulated emission*
- ☐ Electron energy loss spectroscopy (EELS)
- ☐ Electron microscopy
  - ☐ *Ballistic electron emission microscopy (BEEM)*
  - ☐ *Low-energy electron microscopy (LEEM)*
  - ☐ *Reflection electron microscopy (REM)*
  - ☐ *Scanning electron microscopy (SEM)*
  - ☐ *Scanning transmission electron microscopy (STEM)*
- ☐ Electron–solid diffraction
  - ☐ *Auger electron diffraction*
  - ☐ *Low energy electron diffraction (LEED)*
  - ☐ *Photoelectron diffraction*
  - ☐ *Photoelectron holography*
  - ☐ *Reflection high-energy electron diffraction (RHEED)*
  - ☐ *Transmission high-energy electron diffraction*
- ☐ Electron–solid scattering and transmission – elastic
- ☐ Electron–solid scattering and transmission – inelastic
- ☐ Electron spin resonance
- ☐ Ellipsometry
- ☐ Field emission microscopy
- ☐ Field emission spectroscopy
- ☐ Field ion microscopy

- ☐ Inverse photoemission spectroscopy
- ☐ Ion etching
- ☐ Ion implantation
- ☐ Ion scattering spectroscopy
  - ☐ *High energy ion scattering (HEIS)*
  - ☐ *Low energy ion scattering (LEIS)*
  - ☐ *Medium energy ion scattering (MEIS)*
- ☐ Isotopic exchange/traces
- ☐ Laser methods
  - ☐ *Laser annealing*
  - ☐ *Laser induced thermal desorption (LITD)*
  - ☐ *Resonance enhanced multiphoton ionization mass spectroscopy (REMPI/MS)*
- ☐ Liquid phase epitaxy
- ☐ Magnetic measurements
- ☐ Metastable induced electron spectroscopy (MIES)
- ☐ Molecular beam epitaxy
- ☐ Molecule–solid reactions
- ☐ Molecule–solid scattering and diffraction – elastic
- ☐ Molecule–solid scattering and diffraction – inelastic
- ☐ Mössbauer spectroscopy
- ☐ Neutron scattering
- ☐ Non-linear optical methods
  - ☐ *Second harmonic generation*
  - ☐ *Sum frequency generation*
- ☐ Nuclear magnetic resonance
- ☐ Nuclear reaction analysis
- ☐ Photoelectron spectroscopy
  - ☐ *Angle resolved photoemission*
  - ☐ *Visible and ultraviolet photoelectron spectroscopy*
  - ☐ *Soft X-ray photoelectron spectroscopy*
  - ☐ *X-ray photoelectron spectroscopy*
  - ☐ *Synchrotron radiation photoelectron spectroscopy*
- ☐ Photon absorption spectroscopy
  - ☐ *Extended X-ray absorption fine structure (EXAFS)*
  - ☐ *Infrared absorption spectroscopy*
  - ☐ *Near edge extended X-ray absorption fine structure (NEXAFS)*
  - ☐ *Photoacoustic spectroscopy*
  - ☐ *Visible/ultraviolet absorption spectroscopy*
  - ☐ *Surface extended X-ray absorption fine structure (SEXAFS)*
  - ☐ *X-ray absorption spectroscopy*
- ☐ Photon stimulated desorption (non-electronic)
- ☐ Plasma processing
- ☐ Positron spectroscopy
- ☐ Radioactive tracer methods
- ☐ Raman scattering spectroscopy
- ☐ Reflection spectroscopy
- ☐ Scanning tunneling microscopy
- ☐ Scanning tunneling spectroscopies
- ☐ Secondary ion mass spectroscopy
- ☐ Solid phase epitaxy
- ☐ Sputter deposition
- ☐ Surface photovoltage spectroscopy
- ☐ Thermal desorption spectroscopy
- ☐ Work function measurements
- ☐ X-ray emission
- ☐ X-ray scattering, diffraction, and reflection
- ☐ X-ray standing waves

Phenomena

- ☐ Adhesion
- ☐ Adsorption kinetics
- ☐ Atom emission
- ☐ Atom–solid interactions
- ☐ Auger ejection
- ☐ Bending of surfaces
- ☐ Catalysis
- ☐ Chemisorption
- ☐ Compound formation
- ☐ Conductivity
- ☐ Corrosion
- ☐ Crystallization
- ☐ Dielectric phenomena
- ☐ Diffusion and migration
- ☐ Electrical transport (conductivity, resistivity, mobility, etc.)
- ☐ Electron bombardment
- ☐ Electron emission
- ☐ Electron–solid interactions
- ☐ Electron stimulated desorption
- ☐ Energy dissipation
- ☐ Epitaxy
- ☐ Etching
- ☐ Evaporation and sublimation
- ☐ Faceting
- ☐ Field effect
- ☐ Field emission
- ☐ Field evaporation
- ☐ Field ionization
- ☐ Friction
- ☐ Growth
- ☐ Hall effect
- ☐ Interface states
- ☐ Ion bombardment
- ☐ Ion emission
- ☐ Ion implantation
- ☐ Ion–solid interactions
- ☐ Light scattering
- ☐ Lubrication
- ☐ Luminescence
  - ☐ *Atom/ion stimulated luminescence*
  - ☐ *Chemiluminescence*
  - ☐ *Electroluminescence*
  - ☐ *Photoluminescence*
- ☐ Magnetic phenomena (cyclotron resonance, phase transitions, etc.)
- ☐ Nucleation
- ☐ Oxidation
- ☐ Photochemistry
- ☐ Photoconductivity
- ☐ Photoelectron diffraction
- ☐ Photoelectron emission
- ☐ Photon emission
- ☐ Photon stimulated desorption
- ☐ Physical adsorption
- ☐ Piezoelectric effect
- ☐ Positron–solid interactions
- ☐ Quantum effects
- ☐ Radiation damage
- ☐ Second harmonic generation
- ☐ Secondary electron emission
- ☐ Self-assembly
- ☐ Sintering
- ☐ Sputtering
- ☐ Step formation and bunching
- ☐ Sticking
- ☐ Superconductivity
- ☐ Surface chemical reaction
- ☐ Surface diffusion
- ☐ Surface electrical transport (surface conductivity, surface recombination, etc.)
- ☐ Surface electronic phenomena (work function, surface potential, surface states, etc.)
- ☐ Surface energy
- ☐ Surface melting
- ☐ Surface photovoltage
- ☐ Surface relaxation and reconstruction
- ☐ Surface roughening
- ☐ Surface segregation
- ☐ Surface stress
- ☐ Surface structure, morphology, roughness, and topography
- ☐ Surface tension
- ☐ Surface thermodynamics (including phase transitions)
- ☐ Surface waves
  - ☐ *Acoustic waves*
  - ☐ *Capillary waves*
  - ☐ *Magnons*
  - ☐ *Phonons*
  - ☐ *Plasmons*
  - ☐ *Polaritons*
- ☐ Thermal desorption
- ☐ Thermionic emission
- ☐ Tribology
- ☐ Tunneling
- ☐ Vibrations of adsorbed molecules
- ☐ Wetting

Materials index

ELEMENTAL AND CHEMICAL IDENTITY
(Include each component of an interface or multilayer structure as a separate category. Add your own specific elemental or chemical label if a suitable entry is not on the list.)

Elements
- ☐ Alkali metals
- ☐ Alkaline earth metals
- ☐ Aluminum
- ☐ Antimony
- ☐ Arsenic
- ☐ Bismuth
- ☐ Boron
- ☐ Bromine
- ☐ Cadmium
- ☐ Carbon
- ☐ Cerium
- ☐ Chalcogens
- ☐ Chlorine
- ☐ Chromium
- ☐ Cobalt
- ☐ Copper
- ☐ Diamond
- ☐ Gallium
- ☐ Germanium
- ☐ Gold
- ☐ Graphite
- ☐ Hafnium
- ☐ Hydrogen
- ☐ Indium
- ☐ Iodine
- ☐ Iridium
- ☐ Iron
- ☐ Lanthanides
- ☐ Lead
- ☐ Manganese
- ☐ Mercury
- ☐ Molybdenum
- ☐ Nickel
- ☐ Niobium
- ☐ Nitrogen
- ☐ Noble gases
- ☐ Osmium
- ☐ Palladium
- ☐ Phosphorus
- ☐ Platinum
- ☐ Rhenium
- ☐ Rhodium
- ☐ Ruthenium
- ☐ Scandium
- ☐ Silicon
- ☐ Silver
- ☐ Tantalum
- ☐ Technetium
- ☐ Thallium
- ☐ Thorium
- ☐ Tin
- ☐ Titanium
- ☐ Tungsten
- ☐ Uranium
- ☐ Vanadium
- ☐ Ytterbium
- ☐ Yttrium
- ☐ Zinc
- ☐ Zirconium
- ☐ Other .....*

Compounds (non-molecular solids)
- ☐ Alkali halides
- ☐ Alloys
- ☐ Aluminum oxide
- ☐ Barium oxide
- ☐ Biological compounds
- ☐ Borides
- ☐ Boron nitride
- ☐ Cadmium selenide
- ☐ Cadmium sulphide
- ☐ Cadmium telluride
- ☐ Carbides
- ☐ Cobalt oxides
- ☐ Copper oxides
- ☐ Gallium antimonide
- ☐ Gallium arsenide
- ☐ Gallium nitride
- ☐ Gallium phosphide
- ☐ Gallium selenide
- ☐ Halides
- ☐ Hydrides
- ☐ Indium antimonide
- ☐ Indium arsenide
- ☐ Indium oxides
- ☐ Indium phosphide
- ☐ Inorganic compounds
- ☐ Iron oxide
- ☐ Lead telluride
- ☐ Magnesium oxides
- ☐ Mercury telluride
- ☐ Mica
- ☐ Molybdenum oxides
- ☐ Nickel carbide
- ☐ Nickel oxides
- ☐ Nickel sulphide
- ☐ Nitrides
- ☐ Silicides
- ☐ Silicon carbide
- ☐ Silicon–germanium
- ☐ Silicon nitride
- ☐ Silicon oxides
- ☐ Steel
- ☐ Sulphides
- ☐ Tin oxides
- ☐ Tin telluride
- ☐ Titanium carbide
- ☐ Titanium oxide
- ☐ Tungsten oxide
- ☐ Uranium oxide
- ☐ Vanadium oxide
- ☐ Zeolites
- ☐ Zinc oxide
- ☐ Zinc selenide
- ☐ Other .....*

Molecules
- ☐ Alcohols
- ☐ Aldehydes
- ☐ Alkanes
- ☐ Alkenes
- ☐ Alkynes
- ☐ Ammonia
- ☐ Aromatics
- ☐ Biological molecules – nucleic acids
- ☐ Biological molecules – proteins
- ☐ Biological molecules – other .....*
- ☐ Carbon dioxide
- ☐ Carbon monoxide
- ☐ Carboxylic acid
- ☐ Cyanogen
- ☐ Deuterium
- ☐ Esters
- ☐ Ethers
- ☐ Fullerenes
- ☐ Halogens
- ☐ Hydrogen
- ☐ Hydrogen cyanide
- ☐ Hydrogen sulphide
- ☐ Ketones
- ☐ Nitrogen
- ☐ Nitrogen oxides
- ☐ Oxygen
- ☐ Ozone
- ☐ Phosphine
- ☐ Silane
- ☐ Sulphur dioxide
- ☐ Sulphur hexafluoride
- ☐ Water
- ☐ Other .....*

PHYSICAL STATE

Surfaces
- ☐ Amorphous surfaces
- ☐ Dendritic and/or fractile surfaces
- ☐ Glass surfaces
- ☐ Liquid surfaces
- ☐ Polycrystalline surfaces

- ☐ Single crystal surfaces
  - ☐ *Low index single crystal surfaces*
  - ☐ *High index single crystal surfaces*
  - ☐ *Stepped single crystal surfaces*
  - ☐ *Vicinal single crystal surfaces*
  - ☐ *Curved surfaces*
- ☐ Surface defects
- ☐ Whiskers

Interfaces
- ☐ Crystalline–amorphous interfaces
- ☐ Crystalline–glass interfaces
- ☐ Grain boundaries
- ☐ Liquid–gas interfaces
- ☐ Single crystal epitaxy
- ☐ Solid–liquid interfaces
- ☐ Solid–gas interfaces

Heterostructures
- ☐ Heterojunctions
- ☐ Quantum wells
- ☐ Superlattices

Non-epitaxial thin film structures
- ☐ Amorphous thin films
- ☐ Ceramic thin films
- ☐ Glassy thin films
- ☐ Polycrystalline thin films

☐ **Adatoms**

☐ **Clusters**

Particulate composites
- ☐ Blacks
- ☐ Ceramics
- ☐ Powders

☐ **Coatings**

☐ **Porous solids**

ELECTRICAL AND MAGNETIC BEHAVIOR

Surfaces and/or films
- ☐ Insulating films
- ☐ Insulating surfaces
- ☐ Magnetic films
- ☐ Magnetic surfaces
- ☐ Metallic films
- ☐ Metallic surfaces
- ☐ Semiconducting films
- ☐ Semiconducting surfaces
- ☐ Superconducting films
- ☐ Superconducting surfaces

Interfaces
- ☐ Magnetic interfaces
- ☐ Metal–electrolyte interfaces
- ☐ Metal–insulator interfaces
- ☐ Metal–metal interfaces
- ☐ Metal–semiconductor interfaces
- ☐ Schottky barrier
- ☐ Semiconductor–electrolyte interfaces
- ☐ Semiconductor–insulator interfaces
- ☐ Semiconductor–semiconductor interfaces
- ☐ Semiconductor–superconductor interfaces
- ☐ Other interfaces .....*

Heterostructures and thin film structures
- ☐ Metal–metal magnetic heterostructures
- ☐ Metal–metal magnetic thin film structures
- ☐ Metal–metal nonmagnetic heterostructures
- ☐ Metal–metal nonmagnetic thin film structures
- ☐ Metal–oxide–semiconductor (MOS) structures
- ☐ Metal–semiconductor magnetic heterostructures
- ☐ Metal–semiconductor magnetic thin film structures
- ☐ Metal–semiconductor nonmagnetic heterostructures
- ☐ Metal–semiconductor nonmagnetic thin film structures
- ☐ Semiconductor–semiconductor heterostructures
- ☐ Semiconductor–semiconductor thin film structures
- ☐ Superconductor–semiconductor heterostructures
- ☐ Superconductor–semiconductor thin film structures
- ☐ Other heterostructures .....*
- ☐ Other thin film structures .....*

☐ **Contacts**

*Please, fill in necessary new Materials Index Keyword. If the new keyword is indicated on the manuscript, please, make clear to which subcategory it belongs.